

CompuFlow[®] ThermoAnemometer Model 8575



ALNOR[®]

A TSI[®] Company

Safety Notice

When using the instrument to check air flow at ceiling diffusers, make certain that you can safely hold the unit while making measurements, especially when working on a ladder.

Observe all necessary precautions so that the unit does not get caught in moving machinery.

The instrument is not designed for gas mixtures other than air. Any use with corrosive or other dangerous or explosive gas mixtures is not recommended.

Warning

The meter is designed to measure only low voltages in the range of 0 to 3 volts. Use only Alnor probes designed for this meter.

Battery Caution

If the instrument is not to be used for more than two months, remove the batteries and store them in a separate plastic container to avoid possible damage from leakage.

Warranty

Warranty information is specified on the last page of the manual. The reply card is enclosed elsewhere in this package.

Warning

Opening or otherwise attempting to service your Alnor instrument will void the warranty or factory calibration. Please read the warranty statement and calibration instructions carefully.

Trademarks

The following are Trademarks of the Alnor Instrument Company:

AIRGARD	DIGITHERM	PYRO POINT
ALNOR	MICROPRINTER	PYROTAC
AL-TEMP	PREZZURGARD	PYROTROLLER
BALOMETER	PYROCON	THERMOCON
COMPUFLOW	PYROLANCE	VELOMETER
DEWPOINTER	PYROMATIC	VELOMETER JR.
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NOTES

GENERAL DESCRIPTION

The ALNOR Compuflow Model 8575 is a multi-use meter capable of connecting to a number of ALNOR probes. This hand-held, battery operated instrument can perform several kinds of measurements: temperature, velocity, relative humidity or volume depending upon the probe which is attached. The sensors (2 typically) are housed in the probe which is connected to the meter. These sensors output voltages to the meter, and store their calibration parameters internally. The microprocessor in the meter measures sensor output voltages and retrieves sensor calibration parameters at startup. It then calculates the measurements and displays readings (e.g. "°C" and "m/s"). The display can include a bar graph of the measurement. Moreover, the meter can display text in one of several languages. The remote output connects to a printer for hard copies. Set points can be chosen which trigger an audible alarm when readings are outside the specified range. An automatic shut-off feature can be enabled to turn off the meter after a fixed period of keypad inactivity. The meter provides a non-volatile memory which stores hundreds of data points. The internal battery guarantees many years of uninterrupted memory retention. Data is organized internally into "groups", each group corresponding to a set of data points sharing common units. The meter creates a new memory group each time a unit is changed. Data memory can be displayed, printed, downloaded, or erased. The meter will display statistics when the memory is accessed. Statistics available are: size of data group, average, maximum reading, and minimum reading. The meter memory also stores meter calibration and settings which control sampling interval, language used, alarm set points, etc.

The 8575 meter can be operated remotely by connecting a data terminal to the printer/computer connector. In this mode, the terminal will replace the printer as the hard copy device. Several functions are available remotely. See Section SERIAL COMMUNICATION WITH A PC.

The 8575 meter can operate velocity probes in three modes:

- 1 "NORMAL" mode, in which the meter will display the velocity computed directly from the sensor. The undamped bar graph simplifies viewing measurements which exhibit rapid magnitude variations. As an alternative, the meter will display velocity and temperature simultaneously without showing a bar graph.

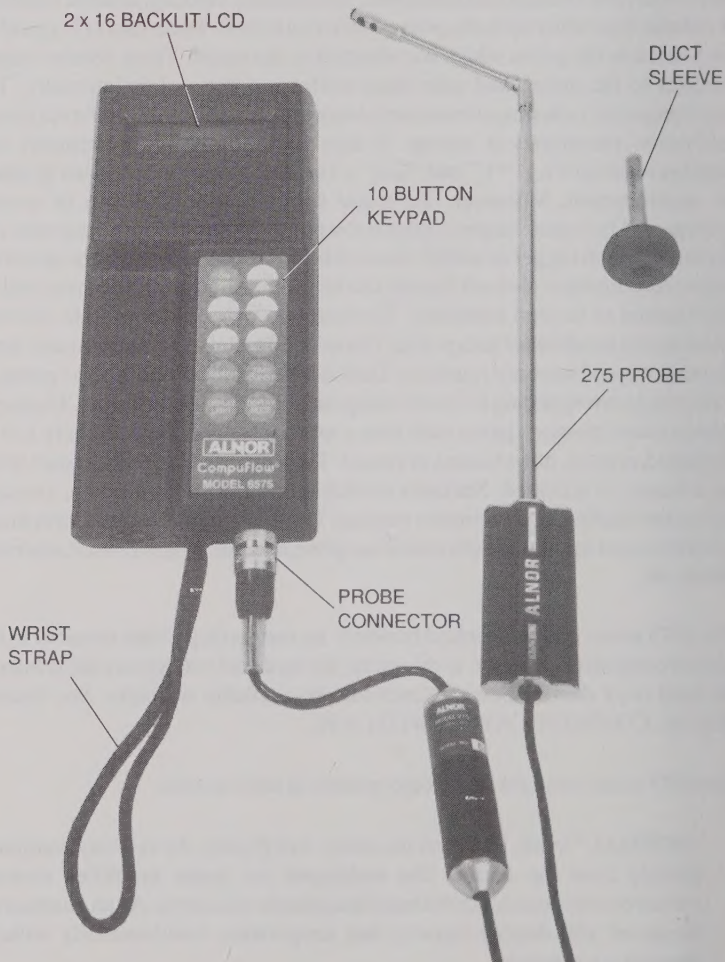


Figure 1. The Top View of the 8575

- 2 "VELOCITY SWEEP" mode, in which velocities are recorded at predetermined time intervals. This mode saves time when the average velocity in a duct is required. See SWEEP Section.
- 3 "VELOCITY-TO-VOLUME" mode, in which meter computes air volume based on air velocity and duct area. This mode is used when air supply or exhaust volume is needed. See VOLUME MODE Section.

DISPLAY

The instrument has a 2 X 16 character, high contrast liquid crystal display (LCD) with backlighting. This display allows for short messages to be displayed. All messages are programmed in several languages.

KEYPAD

The 10 button keypad has 6 dual purpose buttons located in the upper section. These buttons have different uses depending on the status of the instrument. See Section called BASIC KEY FUNCTIONS for individual descriptions.

CONNECTOR

The 12 pin Circular "DIN" style connector mates with probes which connect to the 8575. This is a screw type locking connector with a keyway to ensure the correct positioning of connector pins. After keyway is aligned insert connector. Then tighten securely. Do not overtighten.

275 PROBE

Shown with the 8575 is the Model 275 thermoanemometer probe. This probe measures air velocity and temperature. When volume mode is selected on the 8575 meter volumetric flow rate can also be displayed, stored and recorded.

DUCT SLEEVE

The duct sleeve shown is used to protect the sensor elements when inserting the probe into insulated ducts. A 3/8" hole needs to be drilled to accommodate the sleeve. Insert the sleeve in the duct. Slide the Model 275 probe through the sleeve.

QUICK REFERENCE GUIDE

A quick reference guide is provided on the rear of the instrument.



Figure 2. The Rear View of the 8575

BATTERIES AND COMPARTMENT

The 8575 is shown here with the battery cover removed displaying the rechargeable "C" size NiCd batteries. This instrument will also accept alkaline batteries.

In order to remove the battery cover, push the tab marked OPEN toward the top of the instrument and then pull up.

WARNINGS

DO NOT USE THE BATTERY CHARGER WITH ALKALINE BATTERIES.

INSPECT BATTERIES EVERY TWO MONTHS FOR LEAKAGE.

DO NOT INSTALL BATTERIES INCORRECTLY. DAMAGE TO THE METER WILL OCCUR.

BATTERY CHARGER

The battery charger is a 120 VAC to 4.5 VDC transformer with a current rating of 180 mA. It will recharge the batteries provided with the instrument in 12 - 14 hours.

The end view depicts the connections of the 8575 meter.

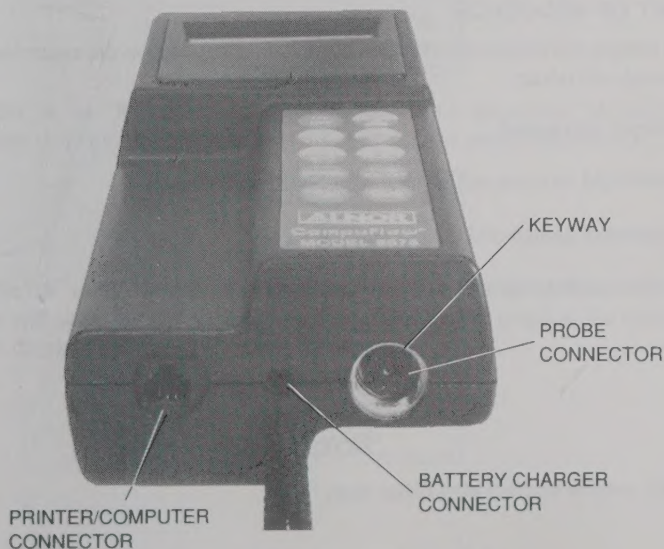


Figure 3. The End View of the 8575

PRINTER/COMPUTER CONNECTOR

This is a standard 6 pin modular jack typically found on the rear of a telephone. The output is RS232 level serial communication. The Model 8521 Microprinter connects directly to this output. The serial port of a computer may be connected to this output using the optional PC Serial Cable which is available.

BATTERY CHARGER CONNECTOR

Connect the ALNOR battery charger to the 8575 at this location. Do not use other manufacturer's chargers.

THE PROBE CONNECTOR

Connect ALNOR probes here. The 12 pin Circular "DIN" style connector mates with probes which connect to the 8575. This is a screw type locking connector with a keyway to ensure the correct positioning of connector pins. Note the orientation of the keyway. After keyway is aligned insert connector. Then tighten securely. Do not over tighten.

OPERATION

START UP SEQUENCE

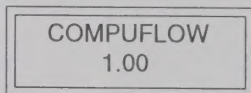
Upon turning the instrument on some basic items are tested in the meter and the following will occur:

The beeper will sound.

The backlight turns on and all character blocks will darken.

The segments lighten and the backlight goes off.

The meter displays the software version number:



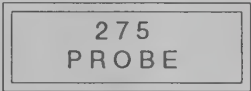
NOTE

The version number may differ from "1.00".

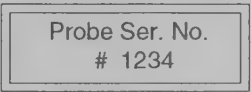
The meter displays the serial number:



If a probe is connected the meter will display the type:



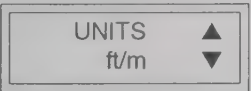
Then the probe's serial number:



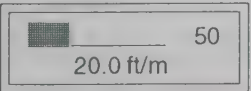
If the probe type is different than the last probe type attached, or the probe has been disconnected, the unit will prompt the user to input the desired units to be used for each sensor. These units include temperature, velocity, volumetric flow rate or humidity, depending on the probe attached.



Use the "▲" or "▼" keys to change to the desired unit, then press "SELECT". In the case of a velocity probe such as a 275 Probe, the meter will display:

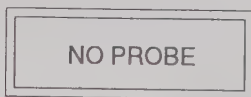


Use the "▲" or "▼" keys to change to the desired unit, then press "SELECT". The meter will immediately enter reading mode with the bar graph on the upper line of the display.



The instrument is now ready to take readings. Press the hold key once to freeze the display. Press it again to store and print that value. Press and hold for 4-5 beeps to end a data group. Press “▲” to display and print the min., max., and average values of each sensor for that data group.

If no probes are connected or a bad connection exists, the meter will cycle through display messages until it shows:



The meter must be turned off and back on again after a probe has been properly connected in order for the calibration constants to be properly read. The start-up sequence should proceed as described above.

BASIC KEY FUNCTIONS

The multifunction keys are denoted with two colors to remind the user of their dual purpose. The “white” function of the multipurpose keys are those functions which will be initiated when that key is pressed in the normal run mode. The blue function of those keys are functions which are used once in a menu or a mode other than the normal run mode. All solid blue keys toggle the desired function. Press once to enter that mode/menu, then press again to exit.

Whenever the meter displays the “▲” and “▼” symbols on the right hand side of the display, the user has a choice of changing the display by using those keys on the keypad or selecting the displayed option by pressing the “Select” key.

When selecting a numeric value in any menu, holding down either arrow key for 10 numeric value changes will cause the meter to change to “fast” mode. This will allow the user to quickly arrive at a new value.

THE “ON/OFF” KEY

The “ON/OFF” key allows the user to switch the instrument on and off. This key can also be used to exit menus when no change is desired. It is the **ONLY** key used to exit the memory review mode or skip viewing and printing the statistics at the end of a hold or sweep sequence.

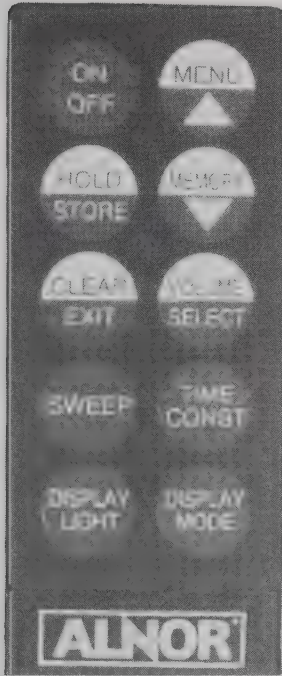


Figure 4. Basic Key Functions

THE “HOLD/STORE” KEY

This key serves two functions. The first function stores and prints (if a printer is connected) and the second function ends the current data group.

THE “CLEAR/EXIT” KEY

This key allows the user to exit menus and clear data.

When in normal run mode, this key will allow the user to erase the memory's entire contents.

When in the memory recall mode this key will allow the user to erase individual data points.

THE “SWEEP” KEY

This key initiates an auto sampling mode in which data points are taken at a user definable interval. A beep will sound to indicate the data point has been taken and the probe can be moved to the next location, if for example, a traverse is being performed.

THE “DISPLAY LIGHT” KEY

The LCD's backlighting option can be turned on by pressing the display light key in the normal run mode. Press it again to turn it off.

THE “MENU/▲” KEY

The main menu may be brought up by pressing this key in the normal run mode.

Anytime the up and down arrows are displayed on the right side of the display this key may be pressed to move “up” in the menu or increase a numeric value.

THE “MEMORY/▼” KEY

All stored data points may be viewed by pressing this key. The memory recall mode automatically calculates and displays the min, max and average of each data group.

Similar to the “▲” key, anytime the up and down arrows are displayed on the right side of the display, this key may be pressed to move “down” in the menu or decrease a numeric value.

THE “VOLUME/SELECT” KEY

The volume menu may be activated by pressing this key when in the normal run mode. This menu gives the user various options for measuring volumetric flow rate using a velocity probe.

In any menu, a choice may be made by pressing this key to select that option or value. A selection may be made whenever the up and down arrows are visible on the right side of the display.

THE “TIME CONSTANT” KEY

The amount of damping applied to the flow sensor may be altered. By selecting one of the settings, the response of the instrument may be altered from a quick to a slow response. See Specifications for the exact damping method used for each setting.

THE “DISPLAY MODE” KEY

This key switches the display mode from a single parameter with a bar graph to a dual parameter display. Press it again to go back to the bar graph mode.

DETAILED OPERATION

HOLD/STORE/PRINT

NOTE

Whenever the meter sends data to the RS232 connector (whether a device is connected or not), the meter will display:

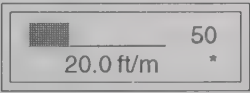


to inform the user that the meter is performing a dedicated function. This message may be displayed at other times.

When the “HOLD/STORE” key is pressed for the first time in a data set, the display will show:



for about 1 second. The second line states how many points have previously been stored in the current data group. The meter will then display the held value. This display is “frozen” and no further readings are taken until one of two keys are pressed. The meter is now in the HOLD mode. This is noted on the display by an asterisk in the lower right corner as shown:



If “HOLD/STORE” is pressed again, the displayed reading along with the reading of the other sensor is stored to memory (velocity and temperature in this example). At the same time, the readings from both sensors are sent to the serial port for either printing or logging by a computer. After printing, the meter returns to normal run mode. The printer output will look like:

20.0ft/m 72.5°F

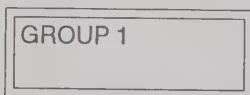
However, if the “CLEAR/EXIT” key is pressed, then the meter returns to normal run mode without storing or printing that data point.

Data points taken in the manner described above will be a part of the same data group provided:

1. The units of measure are not changed. This includes entering volume mode.
2. The data group is not manually ended by holding the hold key down.
3. A sweep is not performed.

To end a data group manually, press and hold the “HOLD/STORE” key until a “BUSY” message is displayed. The meter will NOT store the current value when ending a data group.

The following is displayed:



This indicates that the data group was completed and the data just taken (in this example) are part of the first data group.

Press the “▲” to cycle through the average, min. and max of the temperature sensor and likewise for the velocity sensor. The “Group #” display continues to be shown, alternating between the statistical displays and data points to remind the operator which group is being viewed.

After cycling through these values they are then downloaded to the serial port along with a date and sign line. The “BUSY” message is displayed during this operation. Finally, the group number is incremented thus ending the data group. The display will show:



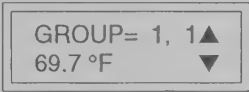
To skip over the display and printing of the min., max., and average, hold down the “ON” key until the “GROUP +1” message is displayed.

MEMORY REVIEWING/EDITING/DOWNLOADING

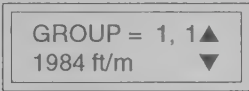
To review the stored data press the “MEMORY” key. If no data points are stored the meter will display:



If data points have been stored, the meter will display the temperature measurement for the first point of the first data group.



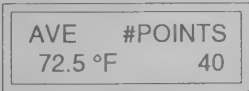
Press the “▲” key to display the velocity, volumetric flow rate or humidity measurement for the first point of the first data group.



Continue pressing the “▲” key to cycle through the rest of the data points of the first set. After the last point is displayed, the statistics of that data group are displayed. Beginning with the Group number:



Press the “▲” key to view the average of the temperature measurement and the number of points of the first data group.



The "Group #" display continues to be shown, alternating between the statistical displays. Press the "▲" key twice to view the minimum and maximum values of the temperature measurement for the first data group.

MIN	MAX
69.5	92.0

Press the "▲" key twice to display the average of the velocity, volumetric flow rate or humidity measurement for the first data group.

AVE	#POINTS
2112 ft/m	40

Press the "▲" key twice to view the minimum and maximum values of the velocity, volumetric flow rate or humidity measurement for the first data group.

MIN	MAX
1492	2444

Press the "▲" key once to display the temperature measurement of the second memory group. Cycling through the other memory groups continues in the same fashion as just described.

Pressing the "▼" key will allow cycling backwards through the memory. When the min., max., avg. of a set are viewed, the "Group #" display will again alternate between statistical displays to remind the operator which set of statistics are being viewed.

To delete a single data point, press the "Clear" key when viewing the value of either sensor of that data point. The meter will display:

CLEAR	DATA	▲
	NO	▼

Use the "▲" key to display "YES". Implement the choice by pressing "Select".

To delete the ENTIRE contents of the memory, press the "Clear" key when in normal run mode. The prompt will be identical to that shown above.

Use the “ON/OFF” key to EXIT the memory review/edit mode. Press “ON/OFF” once if viewing a data point. If viewing statistics, press and hold until the statistics are exited. Then, press once more while viewing a data point to fully exit the memory review mode.

Downloading the memory contents may be done by entering the MAIN menu from the normal run mode. See MEMORY DOWNLOAD Section for more information.

When the memory is full, any attempt to store more points will cause a “Memory Full” message to appear on the display. The data is not stored but is printed. The memory must be cleared before any further storage can be performed.

SWEEP

The Sweep Function allows the user to automate the measurement process. The Sweep can be used to take readings at a single point over time or be used to automatically enter readings while performing a traverse of an area or duct.

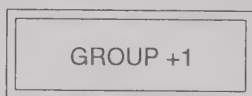
To initiate a sweep, press the “SWEEP” key. Once the key is pressed the meter beeps to indicate that it is in sweep mode. The meter switches to the dual sensor display (no bar Graph) if it was not already in that mode. The meter will display a number in the upper right corner. This number indicates how many data points have been taken. This number starts at zero. A flashing “block” character may be seen in the lower right corner of the display.

The meter then waits the time interval specified. This allows the user time for positioning of the probe for the first data point. The time interval can be set between 1 second and 1 hour. The sweep interval may be changed through the main menu (see MAIN MENU OPTIONS Section for details). At the end of each time interval, the data is printed and then stored in memory. If the interval is less than 5 seconds, the data will not be printed, but only stored to memory. The display is then updated and the number in the corner is incremented. The display continues to change showing the current values until the next point is taken. All data points taken during a single sweep are stored in a common memory block. Along with each data point, the time interval at which it was taken is printed. This provides reference for the time interval set for the sweep mode.

To end a traverse, press the “Sweep” or “Exit” keys. It is important to wait until the meter beeps and displays the number of desired points in the upper right hand corner. This ensures that the data is in memory and the average is being computed on the correct number of points. The current Group # is then displayed.



Refer to HOLD/STORE/PRINT Section for cycling through the display and printing of the average, min., and max. Also, skipping the process is identical to that described in the HOLD/STORE/PRINT Section. The display then shows:



and continues with normal operation.

Notes on Sweep:

This mode must be exited in order for any other operation to be performed (Press “Sweep” or “Clear/Exit” keys). When the memory is full the sweep mode will stop so that no previous data will be overwritten. Once stopped, the current group number is displayed. Refer to HOLD/STORE/PRINT Section for cycling through the display and printing of the average, min., and max.

VOLUME MODE

Pressing the “Volume” key when in normal run mode brings up the Volume menu. This option should only be used with velocity probes. This cannot be used with a probe which is already programmed for volume measurement. Four options are available in the volume mode: Round, Rectangular, Area, Horn. The volume mode multiplies the linear flow rate by a specified area.

Once in the Volume menu, use the arrow keys to scroll through the available options. Choose the desired option with the “Select” key. Once in the Area, Round or Rectangular menu, change to the desired dimensions using the arrow keys. There are two speeds for scrolling. Once the desired dimensions are on the display, press the “Select” key. The meter will then print out the selected dimensions for documentation purposes. At this time, if the area choice was not selected, the meter calculates and stores the area to be applied to the velocity reading.

Each time a hold/store or sweep operation is performed, the calculated area is printed with the reading. The area associated with that point is stored to memory and is printed when a memory download is performed.

The default unit for the X-Y and R dimensions is inches or meters. The default unit for Area is ft^2 or m^2 . If the selected velocity units are metric the linear and area dimensions will default to metric.

The selection Horn in the volume menu has four choices. These are AM100, AM300, AM600, AM1200. These are venturi like devices available for obtaining volumetric flow rate readings when a 175 probe is properly mounted with them. By selecting any of these, a single area constant associated with that particular horn is stored for use. This area constant is printed and stored for downloading later, just as any user selected area would. Those devices are only available in Europe.

MAIN MENU OPTIONS

Pressing the "MENU" Key activates the main menu. Use the arrow keys to move in either direction through the main menu. Once the desired selection is on the display, it can be selected by pressing the "Select" key.

"CHANGE UNITS"

Allows the user to choose the desired operating units. Use the arrow and select keys to choose the desired units. When in single sensor mode (with bar graph) whichever units are selected in this menu will be displayed with a bar graph. If units are selected when in dual sensor mode, those units will be displayed in that mode. Upon return to single sensor mode the last selected unit will be displayed with the bar graph.

"CHANGE SWEEP"

Allows the user to change the time interval for the autosampling mode. Use the arrow and select keys to choose the desired delay. The format for the sweep delay is:

HH:MM:SS

i.e.,

Hours:minutes:seconds

The minimum allowable sweep delay is 1 second. This is the minimum amount of time required to sample, and store a single data point consisting of both a flow (or RH) and a temperature value. For sweep delays of 5 seconds or greater, the data is also sent to the printer/computer connector for either printing or data logging by a computer. The maximum delay is one hour.

“CHANGE LANGUAGE”

Allows the user to select the desired language for menus and messages. Use the arrow and select keys to choose the desired language. See trouble shooting section in case a different language is selected by accident.

“CHANGE K_f MULTIPLIER”

Allows the user to change the K_f multiplier. The K_f multiplier is a user definable value. It can be used as a correction factor for compensating for actual versus standard conditions or any other type of correction desired. Use the arrow and select keys to choose the desired K_f multiplier. This is a constant to be multiplied to any flow rate. If the K_f is ANY number other than 1.000 the “k” symbol will appear in the lower right hand corner. Turning the instrument off and back on again will reset the K_f value back to 1.000.

“MEMORY DOWNLOAD”

Selecting this function causes the complete contents of the memory to be downloaded to the printer port. Connect to the port, either the serial printer Model 8521 or a PC running communication software such as Kermit. Using the arrow keys, scroll through the main menu until the display shows “Download Memory”. Pressing the select key will start the downloading of the memory contents.

To abort this process, press and hold the “On/Off” key until an uninterrupted beep is heard, then release the “ON” key. This will not alter the memory contents.

If the download is to a computer with two way communication, sending the “RUN” command to the 8575 before the download is selected will speed up the downloading process. See SERIAL COMMUNICATIONS WITH A PC for more details.

The time needed to download the complete memory is dependant upon how many lines are to be printed. Memory blocks with K_f factors add an extra line for each

data point. The same is true for volume calculations. Also each separate memory block will add about 15 lines to the output. The printer prints at a rate of about .5 lines per second. In case the meter is connected to a PC, the "RUN" command should be sent to the meter before selecting the "Download" command. This will tell the meter that it does not need to wait for the serial printer. The data transmission rate is 1200 Baud.

"CHANGE ALARMS"

High and low alarms can be set for the main sensor (flow or RH). If alarms are desired, use the arrow and select keys to select "yes" then use those keys again to select the desired high and low alarms. Upon entering alarm mode the beeper will sound and the words "HIGH ALARM" or "LOW ALARM" will be printed. Each successive reading in the alarm mode will cause the beeper to sound but the words will only be printed once. Upon return to non-alarm or normal condition, the meter resets and will again print "HIGH ALARM" or "LOW ALARM" if that alarm limit is exceeded. This is to prevent excessive printout during an extended alarm condition.

"CHANGE CONTRAST"

This alters the LCD's contrast level (viewing angle). Use the arrow and select keys to choose the desired contrast level. In case a non viewable contrast is accidentally selected, turn the instrument off and back on again. The meter defaults to a visible contrast level at the time of startup.

"CHANGE AUTO SHUT-OFF"

This function is either on or off. When on, if no buttons are pressed for approximately 20 minutes, the meter will automatically turn off. When this function is off, the meter will remain on until turned off by the keypad, serial communication, or a low battery condition.

"SENSOR CHECK"

Execute this function for reading internal voltages. This menu item is used only for calibration or performance checking. Press "SELECT" to execute this function. Use the arrow keys to change channels. A voltage check after calibration should be performed on channel #1. Use a calibration plug P/N 632-200-002 for performing and verifying a voltage calibration.

Channels of interest are:

#1 is typically temperature sensor

#5 is an internal reference (approximately 5.02 Volts)

#6 is typically the flow or RH sensor

#7 is the battery voltage. Stops at 3.5 volts. Above this batteries are sufficiently charged. Below this the voltages are read accurately to about 0.1 Volts.

“METER CALIBRATION”

This allows the 8575 meter to be calibrated for voltage. See METER CALIBRATION Section for more details.

“USER MENU EXIT”

Allows the user to exit the main menu and return to normal run mode. Press the select key to exit.

SERIAL COMMUNICATION WITH A PC

Using a standard terminal simulation program (e.g. Kermit), memory downloads may be received from the meter. Several commands may also be sent.

The meter communicates at a baud rate of 1200 with one start bit, one stop bit and no parity. This must be set before on the PC before communication can begin.

To send a command, type the letters when in terminal simulation mode. End the command by pressing the <enter> key of the computer. Watch the display of the meter to be sure that command was received in full. If the command was not received in full, type again.

Available commands:

“RUN”

Tells meter not to wait for printer. Useful when downloading large amounts of data to PC.

“XOFF”

Takes meter out of “RUN” mode. Needed if a printer will be connected to the meter. The meter always starts up ready to communicate to a printer, so turning the meter off and back on again will also achieve this.

“PWRD”

Turns instrument off.

“GEE1”

Retrieve Memory. Equivalent to Main Menu's “Memory Download”. If the “GEE1” command is used, the meter does not wait for the printer. There is no need to send the “RUN” command. But if a printer is to be used afterwards, the “XOFF” command must be sent or the meter must be turned off and back on to reset this feature.

METER CALIBRATION

In order to determine if the voltage accuracy of the instrument is within tolerance follow the steps below skipping steps 3-10 (the section on calibration) and only perform the voltage accuracy check.

IMPORTANT

DO NOT EXPOSE THE INSTRUMENT TO VOLTAGES ABOVE 5.5 VOLTS. THIS COULD DAMAGE THE INSTRUMENT.

Equipment Needed:

1. Voltage reference 0.0 - 3.0 Volt. Accurate to 0.05% setting.
2. Calibration adaptor plug. P/N 632-200-002
3. 3 Fully charged “C” size NiCd or alkaline batteries

Procedure

1. Install fully charged NiCd batteries in meter.
2. Using the calibration adaptor ALNOR P/N 632-200-002, connect the meter to the voltage reference.
3. Turn on instrument without probe attached. Allow for the startup procedure. Press the “Menu” key and use the “▲” or “▼” until the meter displays:



- 4 Press “SELECT” key on meter. The meter will display:



5. Press “▲” key.

6. Press the “SELECT” key when the meter displays:

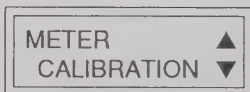


7. Use the “▲” or “▼” until the meter displays the correct password (–75).

8. Press “SELECT”.

9. The meter will prompt the technician to set the input voltage of the voltage reference to a value. Set the voltage reference to this value and press the “SELECT” key of the meter.

10. Repeat the previous step until all calibration points are complete. This will be when the meter displays:

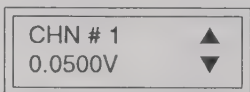


11. Press “▲” or “▼” until the meter displays:



13. Press “SELECT” key.

14. Press “▲” or “▼” until meter is measuring the voltage on multiplexer channel #1. The meter will display:



15. Read second line of display and check for voltage accuracy at points listed on the calibration data sheet originally provided with the instrument. Note the allowable limits listed on the sheet and be sure that these tolerances are held.

16. Press “Exit” to return to the main menu.

MAINTENANCE

Periodic maintenance should be performed on the meter.

- Batteries should be replaced or charged when the low battery “LB” symbol is flashing in the lower right corner of the display. If the battery voltage is too low, the instrument will turn itself off.
- Batteries should be examined every two months for signs of corrosion. If the instrument is not to be used for two months or longer store the batteries separately.
- Calibration check should be performed every six months.
- Keep the instrument clean using a mild detergent. DO NOT use abrasives or solvents. DO NOT allow liquids to enter the instrument case. Dry thoroughly after cleaning
- Use eyeglass cleaner and lens paper to clean the display window. Other items may scratch the window.
- Velocity (thermoanemometer) probes may be cleaned using denatured or isopropyl alcohol. Immerse the probe tip in the alcohol, then dry it in air. Make sure no solid residue remains after drying. Allow the probe tip to thoroughly dry before use. DO NOT apply heat.
- There are no serviceable parts in Alnor’s probes. Do not open handles or electronic housings.

LIST OF MODELS AND PARTS

Part No.	Model	Description
634-493-600	8575	Meter and probe kit
634-493-601	8575	Meter alone
638-493-010	8521	Microprinter, RS232
634-431-021	275	Velocity Probe Alone
634-431-000	265	Velocity Probe Alone
634-100-000	220	Humidity Probe Alone
634-493-404		PC Serial Cable
632-200-002		Calibration Cable
534-493-147		Carry Case
459-000-000		NiCad Batteries
459-009-004		Battery Charger
534-493-127		Duct Sleeve
354-000-001		Tip Protector

CALIBRATION

This instrument should be calibrated with all probes that are used with it, on a semi-annual basis. Refer to the Instructions for Return to have your instrument calibrated.

Refer to Meter Calibration section for calibrating the meter for voltage.

NOTE

Any attempt at calibration by the user voids all calibration certification that may have accompanied the meter and probe.

TROUBLESHOOTING

Display shows over.	Measured value is beyond the range of the probe. See probe manual for limits. Change input to sensor to see if the display changes. Thermoanemometer velocity sensor is broken. Send to factory for repair.
Display shows "NO PROBE"	Connection between meter and probe is faulty. Check probe connection and turn meter off and back on again. If problem persists send meter and probe to factory.
Display does not change.	Meter in hold mode. Check for "*" in lower right corner of display. Press "Clear" or "Hold" key to exit this mode.
Meter turns off after completing start up cycle	The batteries are too low to start. Watch for "LB" display in lower right corner just before turning off. Replace batteries. If new batteries exhibit the same symptom, see section Meter Calibration to determine if the voltage calibration of the instrument is good.
Temperature reading is very low (-40°C)	Temperature sensor is broken. Send to factory for repair.
Meter turns off by itself.	Batteries are too low for readings. Replace batteries. Meter in Auto-shut off mode. Take meter out of this mode through the main menu.
Meter does not turn off.	Meter must be in normal run mode to be turned off.
Measurement is erratic	Input is not steady. Change time constant setting or interpret values from display as is. Probe is not steady. Secure probe.
Erroneous readings	Make sure velocity probes are perpendicular to air flow. Time constant is inappropriate for application. Change time constant value. Probe is dirty. See probe manual. Defective probe and/or meter. Send both to factory for repair.

SPECIFICATIONS*

Range	0.00 to 3.00 Volts
Accuracy	$\pm 0.2\%$ of reading or ± 2 mV, whichever is greater
Memory	300 points consisting of two sensor values (e.g. temperature and flow), K_f if not 1.00 and area multiplier, 1–300 separate groups possible.
Statistics Available	Minimum, maximum, average and size of each data group on each sensor (e.g. temperature and flow)
Battery Life with velocity/Volume probe	12 Hours Alkaline 7 Hours NiCd Note: Backlighting decreases battery life by 15%
Available Units Depending upon probe attached.	m/s, km/h, ft/m, ft/s, mi/h m ³ /h, l/s, cfm °C, °F, %rh
Display	2 x16 Supertwist LCD with LED backlight
Operational Temperature	0 to 50°C (32 to 122°F)
Storage Temperature	–40 to 65°C (–40 to 150°F)
Case Material	Impact resistant plastic (ABS)
Connectors	12 pin circular “DIN” style 6 pin modular “phone” jack 5 x 2.1 x 10 mm DC jack
Serial Output	RS232 level, 1200 BAUD, 8 bits, 1 start bit, 1 stop bit, no parity

SPECIFICATIONS* (cont.)

Time Constant Averaging Technique

The averaging technique employed uses a certain percentage of the newly acquired value and adds that to a percentage of the old (currently displayed) value. The percentages add up to 100%. The meter then displays this newly calculated value. The value on the display then becomes the old value, and a new value is acquired. The process then repeats. If the new value is different than the old value by more than the override percentage, then 100% of the new value is displayed.

TIME CONSTANT SETTING	NEW VALUE	OLD VALUE	TIME TO REACH 95% OF INPUT IF LESS THAN OVERRIDE PERCENTAGE (SECONDS)	TIME TO REACH INPUT IF MORE THAN OVERRIDE PERCENTAGE (SECONDS)	OVERRIDE PERCENTAGE
1	100%	0%	1.5 †	1.5 †	50%
2	50%	50%	6	1.5 †	50%
3	25%	75%	12	1.5 †	50%
4	10%	90%	34	1.5 †	50%
5	5%	95%	68	1.5 †	50%

† The time at 1.5 seconds corresponds to two update intervals. Depending on when in the update cycle the step change would occur, this is the maximum time which would be needed to see the change. It is possible to view the change after one update.

Instrument 70 mm x 102 mm x 190 mm
Dimensions 2³/₄" x 4" x 7¹/₂"

Weight with batteries 651 grams
1 lb. 7 oz.

* Any attempt at recalibration by user voids all calibration certification provided with the instrument.
Specifications subject to change without notice.

NOTES

WARRANTY/REPAIR INFORMATION

Contact the distributor in your country, or Alnor Instrument Company directly, before returning your instrument. In North America, contact Alnor before returning your instrument to the factory. See INSTRUCTIONS FOR RETURN. Follow the procedure carefully as it will expedite processing. Failure to follow the procedure will/may cause return of the unit unrepaired. Send your instrument to the factory transportation prepaid. To assure fast turn-around time, fill out this form with as much detail as possible and attach it to the instrument.

Instrument Model _____

Serial Number _____

Date of Purchase _____ Where Purchased _____

Describe Malfunction _____

Describe Environment _____

Return Instrument to:

Name _____

(Your name or company)

Address _____

Telephone _____

Address Correspondence to:

Name _____

Address _____

Telephone _____

INSTRUCTIONS FOR RETURN

Damaged in Transit

All shipments are carefully examined by Alnor Quality Assurance and carefully packed for shipment. On receipt, if the shipping container appears to have been damaged during shipment, the instrument should be thoroughly inspected. The delivering carrier's papers should be signed noting the apparent damage.

If the instrument itself has been damaged, a claim should be promptly filed against the carrier by the customer. The selling agent will assist the customer by supplying all pertinent shipping information; however, the claim must be filed by the insured.

If the instrument is damaged beyond use, a new order should be placed with Alnor while awaiting reimbursement from the carrier for the damaged instrument.

Call Alnor directly for assistance if necessary.

Malfunction

Please follow these steps should you require factory service or repair of your Alnor Instrument:

1. Write or telephone the Alnor distributor in your country for cost of repair or recalibration and shipping instructions. Obtain a Purchase Order or purchase order number from your Purchasing Department showing instrument model number and cost of repair and/or recalibration. Securely package your instrument in a strong container surrounded by at least two inches (5 cm) of suitable shock-absorbing material. Include the Purchase Order, or Reference the Purchase Order on your packing slip.
2. In North America, telephone the Repair Department at the USA factory for cost of repair or recalibration, Authorization for Repair (AFR) number, and shipping instructions. On instruments being returned to the factory for recalibration, determine whether you prefer:
 - Certificate of Calibration, no data (states instrument checked and found to be within accuracy claimed and specifications listed in current literature).
 - Certificate of Traceability to National Institute of Standards and Technology (NIST, formerly NBS) with data (states instrument compared with factory standard traceable to NIST, lists of calibration data, i.e., "Standards reads..." and "This instrument reads...")

Obtain a Purchase Order or purchase order number from your Purchasing Department showing instrument model number and cost of repair and/or recalibration. Securely package your instrument in a strong container surrounded by at least two inches (5 cm) of suitable shock-absorbing material. Include the Purchase Order, or Reference the Purchase Order on your packing slip. Mark the outside of the shipping container with the AFR Control number.

3. Forward the instrument prepaid. See back cover for factory addresses.

Please note that instruments received improperly marked or without an accompanying Purchase Order may be returned at your expense. Please also note that if an AFR# has been assigned, it will be cancelled if the instrument is not received by ALNOR within 60 days.

Warranty

Alnor Instrument Company (Alnor) warrants this product to be free of defects in material and workmanship for a period of two years from the date of original purchase. If the product should become defective during the warranty period, Alnor will repair it or elect to replace it free of charge under the following conditions:

1. Product is returned postpaid per the instructions for return, located in the owner's manual.
2. Owner submits proof of original date of purchase.
3. Alnor will inspect product for defects in material and workmanship. Alnor's decision as to existence of defect, and in the case of defect, to repair or replace will be final.

THIS WARRANTY IS EXCLUSIVE. THERE ARE NO OTHER WARRANTIES EITHER EXPRESSED OR IMPLIED. SPECIFICALLY AND WITHOUT LIMITATION, THERE IS NO WARRANTY, EXPRESSED OR IMPLIED, OF MERCHANTABILITY OR FITNESS FOR PARTICULAR PURPOSE.

This warranty is void if product is misused, used contrary to procedures set forth in the owner's manual, or if product is serviced by anyone other than Alnor's authorized service. This warranty does not cover consumables such as light bulbs, paper, batteries, etc.

Alnor's liability for this product is limited to the above stated warranty and shall not in any event exceed the cost of the product. In no event will Alnor be liable for any direct or consequential damages, including but not limited to lost profits, loss of use, inaccuracies, loss of data, dismantling or reinstallation.

Ownership/Calibration Log

Equipment Log

Date of Purchase _____

Calibration Record _____

- | | | |
|-----------|-----------|-----------|
| 1. _____ | 2. _____ | 3. _____ |
| 4. _____ | 5. _____ | 6. _____ |
| 7. _____ | 8. _____ | 9. _____ |
| 10. _____ | 11. _____ | 12. _____ |

Notes: _____



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